



## Best nursing review paper

## What is the relationship between elements of ICU treatment and memories after discharge in adult ICU survivors?



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At the conclusion of this article a Continuing Professional Development activity is attached

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## ABSTRACT

**Objectives:** Patients admitted to an intensive care unit (ICU) often experience distressing memories during recovery that have been associated with poor psychological and cognitive outcomes. The aim of this literature review was to synthesise the literature reporting on relationships between elements of ICU treatment and memories after discharge in adult ICU survivors.

**Review method used:** Integrative review methods were used to systematically search, select, extract, appraise and summarise current knowledge from the available research and identify gaps in the literature.

**Data sources:** The following electronic databases were systematically searched: PubMed, Ovid EMBASE, EBSCOhost CINAHL, PsycINFO and Cochrane Central Register of Controlled Trials. Additional studies were identified through searches of bibliographies. Original quantitative research articles written in English that were published in peer-review journals were included.

**Review methods:** Data extracted from studies included authors, study aims, population, sample size and characteristics, methods, ICU treatments, ICU memory definitions, data collection strategies and findings. Study quality assessment was based on elements of the Critical Appraisal Skills Programme using the checklists developed for randomised controlled trials and cohort studies.

**Results:** Fourteen articles containing data from 13 studies met the inclusion criteria and were included in the final analysis. The relatively limited evidence about the association between elements of ICU treatment and memories after ICU discharge suggest that deep sedation, corticoids and administration of glucose 50% due to hypoglycaemia contribute to the development of delusional memories and amnesia of ICU stay.

**Conclusions:** The body of literature on the relationship between elements of ICU treatment and memories after ICU discharge is small and at its early stages. Larger studies using rigorous study design are needed in order to evaluate the effects of different elements of ICU treatment on the development of memories of the ICU during recovery.

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## 1. Introduction

Patients admitted to an intensive care unit (ICU) often experience distressing memories during recovery. Specifically, delusional, factual and emotional memories are frequently reported.<sup>1–3</sup> Delusional memories correspond to the recall of unreal events such as hallucinations, nightmares and paranoia, which have been estimated to be present in about 20–48% of patients.<sup>3,4</sup> Factual memories are the recall of real events that occurred during patient's intensive care treatment such as the presence of an endotracheal tube and mechanical ventilation; proportions of patients who recall factual memories vary significantly from 18% to 96%.<sup>1,2</sup> Emotional memories involve the recall of feelings such as anxiety, fear, suffocation and pain and have been reported by highly variable proportions of patients, ranging from 9% to 88%.<sup>1,2,5,6</sup> Lack of memory of ICU events has also been reported in about 18–38% of patients.<sup>1,7</sup>

Memories of ICU treatment play a significant role in the development of post-intensive care syndrome (PICS), a syndrome that is characterised by “*new or worsening impairments in physical, cognitive or mental health status arising after a critical illness and persisting beyond acute care hospitalisation*” (page 4).<sup>8</sup> Memories are thought to specifically affect the psychological and cognitive components of recovery of ICU survivors.<sup>9,10</sup> For instance, delusional and emotional memories have been associated with the development of symptoms of anxiety, depression and posttraumatic stress after ICU discharge.<sup>11–17</sup> The role of factual memories is unclear, with them being identified as protecting patients from anxiety and post-traumatic stress symptoms in some cohorts,<sup>11</sup> while in others factual memories have been associated with poorer psychological health during recovery.<sup>18</sup> The number of distressing memories that patients recall was identified as a significant factor for posttraumatic stress symptoms.<sup>6,16,19,20</sup> The association between cognitive functioning and memories of the ICU has also been explored. An improved cognitive functioning after ICU discharge was found to be significantly associated with having no recollections of the intensive care experience.<sup>21</sup>

A range of elements of ICU treatment have been proposed as affecting psychological health, including the number and type of memories of ICU. These elements of care have included specific categories of medications such as anti-inflammatory medications, for example hydrocortisone<sup>22–24</sup> and sedation and analgesic agents, for example midazolam and opioids.<sup>1,2,25</sup> Further, a link between the level of sedation and psychological health has been proposed, although the evidence of that relationship remains unclear.<sup>26</sup> Given the potential influence of aspects of ICU treatment on memories, and the link between memories of ICU and PICS, it is appropriate to explore these links with a view to adapting our practice to improve memories. A review addressing this topic could not be located in the current literature. The aim of this literature review was to synthesise the literature examining relationships between elements of ICU treatment and memories after discharge in adult ICU survivors.

## 2. Method

Integrative review methods were used to systematically search, select, extract, appraise and synthesise the available research.<sup>27</sup>

### 2.1. Eligibility criteria

Primary research articles were included in the review if they measured the relationship between specific ICU treatments and memories reported by adult ICU survivors. Studies were excluded if they were not written in English. ICU treatments were defined as interventions administered to patients during admission to a critical care unit, e.g. mechanical ventilation, use of invasive devices and

administration of medications. ICU memories were defined as per the study authors, and included factual and delusional memories of the survivors' time in a critical care unit.<sup>11</sup>

### 2.2. Search methods

PubMed, Ovid EMBASE, EBSCOhost CINAHL, PsycINFO and Cochrane Central Register of Controlled Trials were systematically and independently searched in May 2015. Medical Subject Headings (MeSH) were amnesia, memory, intensive care units, critical care, critically ill, critical illness, and intensive care. Additional studies were identified through searches of bibliographies. Searches were performed without year restrictions but were limited to human studies. Titles and abstracts were scanned for relevance and eligibility using the a priori eligibility criteria. The search was undertaken by one author (AU) using search terms developed by the review team. Selection of articles based on the inclusion and exclusion criteria was completed by two authors (AU and LMA) independently, with results compared and disagreements discussed and resolved by the whole team.

### 2.3. Data extraction and quality appraisal

A data extraction form was developed by the study authors (AU and LMA) and applied to each of the included studies. For each paper the author, study objective, population, sample size and characteristics, methods, ICU treatments, ICU memory definitions, data collection strategies, findings and study quality were extracted by study authors (MIC, AU, KC). Study quality assessment, including the elements of validity, significance and usefulness, was based upon elements of the Critical Appraisal Skills Programme (CASP) checklists relevant to each included study.<sup>28</sup>

### 2.4. Data synthesis

Data from the included studies were categorised and summarised to product a coherent and logical summary across the different categories of ICU treatment.

## 3. Results

Following database and bibliographic searching 2748 titles were identified. This number was reduced to 1548 titles after duplicates were removed (Fig. 1).<sup>29</sup> The abstracts of these titles were reviewed and 64 full text articles examined. A further 50 articles were excluded because they did not focus on the review question, with 14 articles (13 studies; one duplicate publication with some additional results<sup>2,18</sup>) included in the synthesis of results. No meta-analyses were able to be undertaken due to the diversity of designs, interventions examined and instruments used to measure memories; this resulted in the absence of multiple studies examining sufficiently similar questions to enable data to be combined.

Randomised controlled trials and cohort studies were the most commonly used designs in the 13 included studies (Table 1). Sample sizes were highly variable, ranging from 11 to 313 participants. Instruments used also varied widely and follow-up was conducted between 3 days and 5 years after ICU discharge. Studies generally had variable levels of both bias and usefulness, with this latter aspect often limited by small sample sizes (Table 2).

Sedation, both in regard to the agents used and the depth of sedation, was the primary intensive care intervention examined in relation to memories after ICU and was the focus of eight studies.<sup>1–3,17,18,30–33</sup> Consequently, the most common theme that was identified focused on sedation and analgesia. The effect of other

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